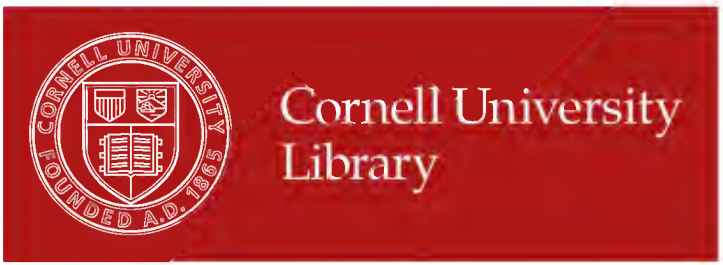

REPORT

BY

MR. JAMES M. SINCLAIR

ON THE

HOG-RAISING AND PORK-PACKING INDUSTRY

IN THE

UNITED STATES,

AND ON THE

LIVE STOCK AND FROZEN MEAT EXPORTATION

OF THE

ARGENTINE REPUBLIC.

By Authority:

ROBT. S. BRAIN, GOVERNMENT PRINTER, MELBOURNE.

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DEPARTMENT OF AGRICULTURE, VICTORIA.

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THE HOG-RAISING AND PORK-PACKING INDUSTRY IN THE UNITED STATES.

Following out instructions received from the Victorian Agricultural Department, investigation and study of the methods, nature, and extent of the above industry in the United States were made. When making these investigations I found quite a new field of information opened up, the surroundings of which, as will be shown, have much in them of interest to the Victorian grain-grower. The low price of wheat, oats, and barley in Victoria, and the impossibility of the farmer realizing a remunerative value for these in selling at present prices, makes any prospect of receiving a better value for them in another direction of special importance. The farmer finds that the production of the cereals referred to, more especially wheat and its shipment for breadstuffs, when sold on the world's market, leaves him no profitable return for his labours. Farmers generally are not aware of the fact that it is quite possible for them to utilize very extensively these cereals on their farms and ship them off in another form, and at the same time realize from 15 to 20 per cent. additional value for them, an increase which embodies in itself all the difference between a tangible profit and a material loss. That this statement is no mere theoretical assertion will be demonstrated in this report. When entering into a study of the surroundings of the pork-raising industry in the United States, I had no idea of the value and importance of the lesson to be learned, and the possible benefits derivable therefrom for the Victorian farmer. As soon as a general idea was grasped of the immense source of profit to the American farmer that there is connected with hog raising and the exportation of hog products in the shape of bacon, pork, and lard, the deepest interest was taken in noting, as far as possible, everything in connexion with the surroundings of the industry. The Victorian farmer has not the remotest conception of the extent to which the United States farmer has developed this important and profitable branch of his agricultural operations. He has also no idea of the extent of the ready market existing in Europe which he may also enter into the profitable supply of, so utilizing a great quantity of his cheap cereals at home and exporting them in the form of hog products just as saleable as his grain, netting at the same time, as stated, from 15 to 20 per cent. over their breadstuffs value.

The market on which the American farmer depends as an outlet for his hog exports, also the extent and value of the requirements of this market, in the products mentioned will be referred to. Outside of the very large local consumption of the United States her surplus for export goes chiefly to Great Britain

Calculation shows that between 20 and 25 per cent. of the flesh food of the United Kingdom consists of hog products. A recent report of the Secretary for Agriculture for the United States—Mr. J. Sterling Morton—(to whom personally I am indebted to for the supply of much valuable information) gives a clear statement of the position held by the States in supplying this demand. The report referred to gives the following table, representing the quantities and value of the bacon, hams, pork, &c., exported from the United States to the United Kingdom during the year ending 30th June, 1894 :—

Product.	Quantities.	Value.
	lbs.	£ s. d.
Bacon	334,985,389	6,273,368 3 0
Hams	73,894,248	1,666,157 2 0
Pork (fresh and pickled)	14,272,957	231,863 0 0
Lard	150,655,158	2,707,769 2 0
Total	573,807,751	10,879,157 7 0

During one month—January, 1894—the United Kingdom took from the United States 35,240,431 lbs. of bacon. The trade in hog products during nine months of 1894 showed an increase of over 45,000,000 lbs. over the same period of 1893.

In addition to this, the United States exports 45,000,000 lbs. of hog products to France, and 100,000,000 lbs. to Germany. From these figures, to which must be added all domestic consumption, an idea will be gleaned of the enormous proportions of the hog industry in the United States. Great Britain, in addition to what she takes from the United States, imports 50,000,000 lbs. of bacon from Denmark, and importations from that country are increasing yearly. Regarding this Danish trade, and the prices realized, Mr. Morton states that Danish bacon brings £2 19s. 1d. per cwt. in Great Britain, against American at £2 0s. 7d. per cwt. The best brands of Canadian singed sides bring in England within 2s. to 4s. per cwt. of the prices of the best Danish bacon, and Canadians command from 2s. to 4s. per cwt. more than American cuts will bring. The reason why both these countries can obtain more for their bacon is that its superiority is due to the fact that their hogs carry from 10 to 15 per cent. more lean and less fat flesh than the American.

This class of lean bacon answers the taste and demand of the British public, and so commands a higher price. In order to bear out this statement Mr. Morton drew attention to a circular issued in England in October, 1894, by the house of Charles and Thomas Harris Limited, of Calne, Wiltshire. This firm's Wiltshire bacon is all through Europe regarded as the standard brand, being in the

highest repute. The circular which was issued to English farmers is as follows :—

Present prices for prime pigs, in lots of not less than 10, on rails, within 100 miles of Calne—

Prime stores.	Thickness of fat in any part of the back.	Price per 20 lbs.
130 lbs. to 190 lbs. ...	$2\frac{1}{4}$ inches and under ...	7s. 6d.
Under 210 lbs. ...	not exceeding $2\frac{1}{2}$ inches ...	6s. 9d.
Under 230 lbs. ...	not exceeding $2\frac{3}{4}$ inches ...	6s. 3d.
Under 240 lbs. ...	not exceeding 3 inches ...	6s. 3d.

This shows that they offered the highest prices for hogs ranging from 130 to 190 lbs., which carried not more than $2\frac{1}{4}$ inches of fat on the back. For such they offered 7s. 6d. per "score," or $4\frac{1}{2}$d. per lb. live weight. Under the Harris plan of purchase, the percentage of lean pigs sent to Calne market in Wiltshire had increased from 47 to 75, and the public demand for this class of bacon had been met by the English farmers changing their breeds. Instead of breeding Berkshires, they had gone in for Tamworth and Yorkshire. The attention of American farmers and packers is being drawn by the Secretary for Agriculture to the class of bacon supplied by the Danish to the British consumer, so that they might place themselves in a position to cater specially for the demands of a market which requires so much of this peculiarly fattened and particularly cured commodity. The demand in England at the present time is for a mildly-cured, not oversalted, and very lean bacon. The bacon trade between Denmark and England is growing greatly, and this is indicated by the increasing number of packing houses in Denmark. Their bacon it seems is sent over in fine condition, and so suits the English taste as to realize within 4s. per cwt. of the best Wiltshire.

The foregoing facts, with the figures given, will show that there is an almost unlimited market for the Victorian farmer if he chooses to avail himself of it, and enter into the hog industry in an extensive manner.

The total number of hogs in the United States in the year 1893, was 45,000,000. The principal states in which they are raised for the market are Iowa (in which state alone there are 6,000,000 hogs), Illinois, Kansas, Nebraska, Missouri, and Ohio. These are all western states, and are the principal ones in which maize, in addition to wheat, is grown. The hogs raised in these states when fat, are chiefly sent to the great markets of Chicago, Kansas City, Omaha, and Cincinatti, and in these cities are situated great packing-houses, where the animals are slaughtered, cured, and packed for export. The percentage of hogs killed on farms, unless for domestic or local use, is very small, the greater portion being sent off alive to the great markets indicated and are there sold by live weight. The slaughtering and curing of hogs is a separate industry, although the best authorities on the matter state that the farmers, by carefully curing them on the farm and

marketing the cured product, will realize more profitable returns than by selling them alive. There is always a ready cash market for well-fattened live hogs, and the majority of farmers seem satisfied to accept this, and let the great packing-houses do the rest, allowing themselves to be contented with the profits attached to breeding, raising, and fattening them.

I shall refer now to the methods adopted in the raising of hogs, and endeavour to give as clearly as possible, all information gathered from a number of farmers who have given special attention to the industry. Owing to the extent of the industry, it was, indeed, hardly possible to meet a farmer who had not a good general knowledge of the animals, and how to raise them profitably. I shall not describe any of the large stock farms, where hogs are raised on a large scale, but describe the system pursued on ordinary farms.

I will first refer to the breeds found to be most profitable.

BREEDS OF HOGS.

Although in sheep breeding, and development of that industry, Australians have gone far ahead of American stock-owners, yet in careful attention, to improvement in the breed of hogs, in order to reach a uniform high standard, the United States farmer simply "lays over" his antipodean compeer. An idea of this, and of the attention paid to the development and maintenance of the highest possible standard, may be gleaned from the fact that the ordinary hogs seen on all farms visited were equal to the best seen exhibited at any agricultural show in Victoria. On no fairly conducted farm could a single weedy hog be seen. I was more impressed with the result of this careful breeding, and resulting uniformity, when visiting the great live-stock yards at Omaha and Chicago. At the latter place, where from 30,000 to 40,000 hogs were sold daily, the animals showed simply perfection of breeding, and a regularity and evenness most striking. In reference to the latter feature I made inquiry, and was informed that 6,079,088 hogs were received at the Chicago stock-yard for the year 1893, and the average weight of the whole number was exactly 240 lbs. each.

The principal breeds of hogs in the United States are the Poland-China, Chesters, and Berkshires. The favorite breed is, however, the Poland-China, and this is evidenced by the fact that three-fourths of the hogs seen for sale, in the great markets previously referred to, are of this class. The almost universal decision given in favour of this breed of hog has been the result of the proof they have given of superiority to all others in many ways, which will be referred to.

The breed of Poland-Chinas originated, it appears, in Ohio, where some 80 years ago a few pure China hogs were introduced. These were subsequently crossed with Russia and Byfield breeds,

and a hog of exceeding fine quality produced. Twenty years subsequent to this Berkshires were introduced and crossed with this hog, and afterwards these again were crossed with the Irish Grazier, producing the breed now known as the Poland-China. The term Poland is misleading, as it seems no such hog was ever used in establishing the breed known under this name. The chief characteristics of the Poland-China, as described by a prominent breeder of swine, are—good length of body, short legs, broad straight backs, deep sides flanking well down on the leg, very broad full square hams and shoulders, drooping ears, short heads, wide between eyes, of spotted or dark colour; are hardy, vigorous, and prolific, and when fat are perfect models all over, combining the excellencies of both large and small breeds. Mr. Coburn, the highest authority on swine in the United States, says, in reference to the Poland-Chinas, what is vastly important to millions of people is the fact that there has been produced a race of swine now bearing that name that very many severely practical and intelligent men consider the best pork-making machines known; in fact, nearer what the farmers of the great west need than any other breed in existence. Their size, colour, hardiness, docility, and good feeding qualities make them favorites when purely bred, and where more fineness of contour, quicker maturity, and less size is demanded we are satisfied that the sows bred to Berkshire boars produce the best feeding and farm hogs in the world.

This is the favorite breed, and coming next to it is the Chester White and Berkshire. The Chester White belongs to Chester county, Pennsylvania, the breed originating there. The Chester Whites are well-formed, easily fattened white hogs. They grow much larger than the Poland-Chinas, and are often killed up to 600 or 800 lbs. weight, and at the Philadelphia Exposition one was exhibited weighing 1,300 lbs. live weight. At the Agricultural College, Ontario, Canada, I saw some very fine Chesters, and with many Canadian farmers they are very popular. Being of white hair and skin, they have the reputation of not being able to stand a warm climate so well as the Poland-China, and at times show a tendency, the same as all other white breeds, to become liable to skin diseases, especially mange.

The Berkshire is too well known to require a description. In the United States, the same as Australia, the Berkshire is distinguished for producing a fine quality of pork, and for its great vigour and hardiness. In some states they are bred extensively, but the Poland-China appears to be the generally universal favorite.

HOUSING AND HOG PADDOCKS.

The American farmer, as a general rule, pays attention to the erection of good comfortable buildings for the care of his breeding sows, and for quarters for the drafts of hogs he has selected

for fattening. The most successful men, and those who make most money at it, provide warm substantial buildings and capacious yards about them. The general plan, in erecting buildings, is to build them so that there is a good passage up the centre for laying a set of wooden rails, on which a trolly can run for conveying barrels of cooked or slop food or water when necessary to the various pens or styes along either side. These pens are partially open on the outward side to yards provided for each. Good attention is paid to proper drainage, and the floors, if not planked and battened to prevent slipping, are paved with wooden blocks or stone. A high site, giving good drainage, is generally selected for these buildings and yards, and attention is paid to the keeping of them clean, as hogs will not thrive in filth and dirt the same as they will when their quarters are kept clean and warm. Generally the farmer has water laid in pipes from his well or windmill to the hog pens, so that plenty of good water is available for them.

When carrying their young ones, the sows are separated from the other hogs and placed in small paddocks of an acre or so in extent, in which is a comfortable shed for sleeping in. Here they have ample room for exercise, and are given plenty of food, but not too rich, as it does not do for them to become too fat, which results in small pigs, and in the sows doing badly in farrowing.

The American farmer generally endeavours to have his crop of young pigs come in April, the first warm days in spring, attention having to be paid to this owing to the severity of the cold on young ones earlier in the season.

When the sows are near their time they are removed to the comfortable pens in the building described, and provided with sufficient (but not too much) bedding. There is a danger of the young ones getting crushed or smothered with too great a depth of bedding. In the majority of breeding pens a rail or scantling is fastened, 6 inches from the floor, and the same distance from the sides, to prevent any chance of the sow crushing any of the little one between the wall and herself. Great care is taken at this time to prevent loss of any of the litter if possible.

The sows receive careful attention, and are given thin nutritious slops for the first four or five days after having young ones. After this, slop food with thicker ingredients added, in the shape of a little steamed crushed wheat or corn. Skimmed milk, where available, and bran and shorts mixed are also good food. In the case of a sow eating her young ones, it has been found that this is generally the result of costiveness, and either fresh earth, grass, rotten wood, charcoal, or even ashes, is put in, for her to eat to relieve this. It has also been found that if the young ones have their hair rubbed over with kerosene, by means of a saturated piece of woollen cloth, that the sow will not touch them.

At three weeks old the young ones usually commence to eat, and it is usual then to give them milk or slops thickened with scalded bran, pollard, &c., in a separate trough in part of the pen, over which a battened framework prevents the sow from getting access to it.

The young ones are weaned at from six to ten weeks old, according to the strength and vigour of the litter. Generally two young ones are allowed to remain with the mother for three or four days, and then one for a day or two longer; the milk by this means being gradually eased off. The sows, if not to be again bred from, are then turned into the pasture paddock, which will be described.

Every farmer giving attention to hog raising in the United States endeavours to have a good pasture paddock enclosed for turning his hogs in. The selection of the site of this is made with great care, as it becomes a very important factor in the economical production of pork. In some parts of the States a rich flat or bottom is selected, and sown down with red clover or Timothy-grasses, and the enclosure made so as to run back on to more elevated ground, having shade trees growing on it. On the western prairies I noticed the hog paddocks selected so as to take in, in addition to the rising ground, a hollow or depression, and if no trees previously existed, cottonwoods or other quick growing varieties were planted to furnish shade to the hogs in hot weather. The apparent requisites for a hog pasture seemed to be good grass land, shelter, shade, and plenty of water. For the latter purpose, where no spring, well, or creek were available for supply, I noticed in Nebraska, Illinois, Iowa, and Indiana dams or tanks excavated on good catchments in the hog pasture field. Plenty of water is indispensable. In Kentucky and other southern states a timbered upland often formed a hog pasture. The extent of a hog paddock depends entirely on the number of hogs being raised on a farm, and may vary from 5 to 50 acres in area.

The hog is naturally a grass-eating animal, and the exercise and liberty of the pasture field enables them to grow and develop in a healthy manner. Here, with a little feed, if the pasture is not rich in itself, they will grow at a small cost to the farmer.

I may here state that the American farmer has a slight advantage over the farmer in northern Victoria in being able to grow artificial grasses. The midland and southern farmer in Victoria can do this. The northern farmer can, however, grow heavy crops of green Cape barley which could afterwards be followed by a few acres of amber cane, pie melons, and pumpkins, all of which yield heavy crops on any piece of fallowed or manured land. These could be fed to growing hogs on any pasture paddock which did not give a sufficient supply of food for them. It has recently been found in the United States that Jerusalem artichokes furnish an excellent food for growing hogs. This is a tuber, and is planted in rich strong land, and when ready to turn the hogs in

has often attained the height of 4 or 5 feet. On the large ranche of Finnell Brothers, in California (referred to in the article on grain production in that state), I saw 70 acres of artichokes on bottom land near the Sacramento River sown by the Messrs. Finnell for their hogs. This was a heavy crop, and 500 hogs were to be turned in to feed on it by rooting up the tubers.

Many of the farmers met with stated that one of the secrets of success in raising hogs profitably lies in the economy of growing them in pasture land with grasses and green food.

The hog paddocks are fenced in securely with either posts and barb wire, drop log fence (two posts side by side, 6 inches apart, and the logs put in between in panels, one end resting on another, wire holding the tops of the posts together), or posts and rails.

The weaned litters, when about twelve weeks old, are turned out in the pasture paddocks, and given attention to, in the way of providing supplementary food, until they begin to do for themselves. Western farmers, early in the spring, plant on a piece of rich land, an early variety of maize, and with it, in every sixth hill, some pumpkin seeds. The corn stalks are cut, and fed, in a green state to the hogs (for which purpose we could use amber cane), and the pumpkin crop follows. The pumpkins are split open, and fed to them also. The seeds of the pumpkins, are generally removed, as they have been found, when eaten in considerably quantities by the hogs, to effect very seriously, their urinary organs.

FATTENING.

At the age of six or seven months the hogs are generally removed to the pens for fattening. These pens are generally in a building like the one previously described, having ample yard room attached. Here they are kept in lots of from five to ten, and twenty in a pen, it not being advisable to feed a large number together. Ample room must be provided for each to eat without crowding. Feeding is then continued until such time as the hogs become sufficiently fat. Hogs in the States, when six months old and have received good attention, both when young and subsequently, are generally from 135 to 140 lbs. in weight. The time taken to fatten, or ripen them as it is generally termed, is about twelve weeks. It is computed that about eleven bushels of crushed maize will enable a hog to be fattened, so as to reach 280 lbs. weight, at the age of nine months.

Maize, or corn as it is termed in the States, has hitherto been the great hog feed, and the production of this in 1893, was 70,626,000 acres, giving a yield of 1,628,464,000 bushels, or three times the quantity of wheat produced. This has been fed in every variety of way to them, and up to last year was looked on as the sole basis of all fattening operations. The major portion of a farmer's corn crop is always expected to walk off the farm in the shape of hogs. If corn is seen growing on a farm, it is a certainty that the hog is around also.

A light yield of corn last year, and the fall in the price of wheat, brought the value of the two grains to a par for a time, corn ruling even higher than wheat. The result of this, coupled with the fact that the farmer found the shipping value of wheat left him no profit, was that everywhere trials or experiments were made at feeding wheat not only to hogs, but milk cows, and for the purpose of fattening cattle, and for food to stock generally. The result of these trials being satisfactory in all cases a new value for wheat has been created, totally independent of its one for breadstuffs. Every agricultural paper in the western States contained articles showing the successful results attending the use of wheat for stock feeding, notably for hog fattening. All the different state experimental farms and agricultural colleges have been engaged in making most careful and exhaustive trials of wheat for fattening hogs, the result being that it is found to be fully equal to corn for this purpose.

The Kansas State Board of Agriculture, one of the best organized and useful in the United States, procured the names and addresses of 1,000 wheat-growers, stock raisers, dairymen, and others, best situated for discriminate observing and careful investigation, and sent to these, with a request for careful answers, a list of questions bearing on the matter.

Some of these, referring to the use of wheat for hogs, were as follows :—

Fed to hogs, does it prove as fattening, pound for pound, as shelled corn ?

How much live pork may be expected as a fair return per bushel of wheat fed to hogs ?

At the same price per bushel (56 lbs. of shelled corn, and 60 lbs. of wheat) what greater or less value would wheat have than corn as a grain for hogs ?

Leaving cost out of question, is it found a satisfactory grain for growing or fattening hogs, and, if not, wherein is defective ?

Is the flesh of wheat-fed hogs as good or better than that from hogs fed on other staple foods, and in what respect does it differ ?

If, for any reason, wheat is not found a satisfactory ration for hogs, what admixture of other grains will make it so, and in what proportion ?

These questions, it will be observed, cover the whole ground, in ascertaining the value of wheat as a hog food. That they were not put at random may be inferred from the fact that they were compiled by Mr. Coburn, the highest authority on swine husbandry in the United States. The answers received were also dealt with by Mr. Coburn in his report to the State Board of Agriculture, so that the utmost reliance can be placed on their value. To this report I am indebted for the following information in reference to this matter :—

The replies from the observant and practical men selected, may be summarized as follows :—Three-fourths of those reporting,

representing 50 counties, stated that pound for pound, wheat is superior to corn for fattening hogs (even with one-fourth unmasticated) by 7 to 35 per cent., the average of these indicating a superiority over corn, of 16 per cent.; while the average of the other one-fourth of the reports, representing 26 counties, indicated that it was less worth than corn by 12 per cent. It was shown that when fed whole, 25 per cent. of the wheat passes the animals unmasticated, and hence undigested and unassimilated, a shameful waste. The average of the estimates made by correspondents in twenty counties, is that 30 per cent. is voided without mastication, the correspondents of five other counties put it at 50 per cent., and those from twelve others at 10 per cent. To the question as to how much live pork may be expected as a fair return per bushel of wheat fed to hogs, the average of all the answers is 11 lbs., and the variations from 7 lbs., in a single instance, to as much as 20 lbs. in one other; but nearly all put their figures at or above 10 lbs.

The replies also stated, almost unanimously, that wheat-fed pork was better than that corn fed, in being firmer, sweeter, and less oily. A unanimous opinion was also expressed in favour of grinding or crushing the wheat, before feeding, in order to prevent the waste in feeding whole grain either dry or soaked.

The foregoing information was obtained after several million bushels of wheat had been used for animal feeding, when farmers had had ample opportunities of judging of its merits for fattening. Therefore, the published report in full of these investigations of the Kaokas State Board of Agriculture, as to the feeding of wheat to farm animals, is of the utmost value in showing that prices of that grain are now so low as to permit its being used profitably in this direction, and if utilized this way giving the producer a value for it far in excess of its present one for breadstuffs.

In reference to the grinding of wheat, an observant writer in the *St. Paul Pioneer Express* stated that of wheat soaked in water many tests had been made, also of whole dry grain, with the result of their passing with poor digestion. The digestible nutrition in these grains is largely enclosed in indigestible woody fibre, and the latter must be broken down by grinding, in order that the nutritious parts may be released. When ground and fed the gastric juices have free access to the digestible nutrition of the grains, and then much larger parts of them are utilized in animal economy.

The experiment stations feeding tests fully sustained these observations in showing the additional pounds of beef and pork made by grinding the grain over feeding it whole.

In the state of Ohio a careful experiment was made, showing the relative fattening properties of wheat and corn. An agricultural paper gives the result, which, perhaps, may be reproduced here, to show how carefully tests have been made in the direction we are referring to. The paper states that the corn fed whole and

dry was almost completely masticated. No kernels of corn passed through the hogs whole, only occasional pieces being seen. In the case of wheat, however, fed in the same manner, much of it was not masticated, as many whole kernels were found. Nine high grade Poland-China hogs, six barrows and three sows, were fed, during a preliminary week, on corn and wheat, half-and-half, by weight. These were divided into three lots, with two barrows and one sow in each lot, due regard being given to weight and apparent feeding quality. One lot was then fed on corn, another wheat, and the other wheat and corn, half-and-half, by weight. In addition, each lot was given water, coal ashes, sulphur, and salt, but no other food whatever.

The hogs were weighed two days before the beginning, two days after the beginning, and upon the day the experiment began. The average of these three weighings was taken as the initial weight. The final weights were obtained in the same way. The experiment continued during ten weeks. A summary of the results is given in the following table :—

Food value of Wheat and Corn.		Lot A—Wheat.	Lot B—Wheat and Corn.	Lot C—Corn.
Average weight 8th, 10th, and 12th February	lbs.	411	401	407
Average weight 19th, 21st, and 23rd April	,,	702	693	678
Gain during ten weeks	,,	291	292	271
Gain daily per pig	,,	1·39	1·39	1·29
Total food eaten during ten weeks ...	,,	1,273	1,240	1,228
Food eaten daily per pig	,,	6·02	5·90	5·85
Increase from one bushel	,,	13·70	...	12·30
Value of bushel, at 21/6 per cwt.		2/11½	...	2/7½
Cost of food for 100 lbs. increase (corn, 1/5½, wheat, 2/3½) ...		16/8	...	11/6

It took 438 lbs of wheat to make 100 lbs. of increase, and 453 lbs. of corn to produce the same gain in weight. A bushel of wheat made 13·7 lbs. of pork, while a bushel of corn made 12·3 lbs. The hogs sold for £1 1s. 6d. per 100 lbs. The wheat in this experiment made an additional 8d. per bushel by being fed into pork. At the time the experiment was made corn had not the same value as wheat has at present.

Everywhere throughout the western States it has been clearly demonstrated that wheat was excellent for hog raising and fattening, and also that feeding it was far more profitable to the farmer than selling it at 1s. 9d. to 2s. 3d. per bushel locally.

In some places it was stated that unthreshed wheat had been fed successfully to hogs. The ripe wheat had been cut, bound, and stacked, and the sheaves given to the hogs in open yards. The hogs in this way eating more slowly were able to digest it

better. This was in the first stages of fattening. The hogs in this way received considerable exercise.

Many farmers in Victoria could not fail to notice how hogs will thrive when turned into wheat stubbles which do not seem to furnish much feed for them, and it seems feasible to imagine that they would do excellently on sheaves of wheat fed to them.

In feeding dry threshed wheat to hogs, farmers in the States stated they masticated it better when it was fed to them sprinkled on the grass, where the latter was not too long. In this way they ate slowly, not having the opportunity to "bolt" it the same as if given to them in a trough.

An enormous consumption of wheat took place in the United States between July and December last in feeding to hogs and all farm animals, consequent on the partial failure in several states of the corn crop and the cheapness of wheat.

In December the *Prairie Farmer*, one of the leading agricultural weekly papers published in Chicago, had careful inquiry made in the various States in order to ascertain as nearly as possible what this consumption of wheat for stock feeding would amount to, and found that 60,000,000 bushels had been used during the previous four months. This enormous consumption has given the United States farmer excellent opportunities for ascertaining, proving, and establishing beyond the range of mere experiment, the great value of wheat for hog raising and fattening, and by using it in this way the present loss attached to its production is greatly minimized.

SLAUGHTERING AND CURING.

The farmer's hogs, when ready for market, if not sold locally to dealers and drovers, are consigned by rail to the nearest large stockyards, to be sold there privately or by auction. All selling is done by live weight. The present average price realized is about 5 dollars per 100 lbs., or as nearly as possible 2½d. per lb. The enormous number of hogs arriving daily at the larger stockyards is a sight to witness. At Chicago, on a single day, 66,000 hogs have been delivered by rail. At the time of my visit 36,000 were in the yards.

Nearly all the great slaughtering and packing houses are situated in close proximity to the stockyards, so that the hogs can pass on into their final stage or condition without much moving about or further handling. The various drafts sold each morning are at once transferred to the yards attached to the packing houses. I visited two packing houses, the first being Cudahy's, at Omaha, Nebraska. At this house 1,500 head of cattle and 2,000 hogs were slaughtered, cured, and packed daily, 2,000 men being employed at it. The other establishment visited was Armour's, at Chicago. This is the largest in the world. At the time of my visit 5,000 hogs and 3,500 head of cattle were being

slaughtered daily, and 5,000 people were employed on the works. When busy, the manager informed me, up to 6,000 employés were at work on the place. They had also slaughtered and treated as many as 11,000 hogs in a single day.

The hogs are passed from the yards, outside of the building, into a pen, holding about 100, inside of the establishment. This is continually being refilled as the hogs are taken out of it. In this pen, in among the hogs, there is a man who catches each one by a hind leg, and slips the loop end of a chain up over the knuckle, where it cannot slip off. This chain is attached to running gear overhead, and in an instant the hog is hoisted in the air, and, the gearing overhead being fitted with rollers, the pendant animal moves on past a man on a platform, who with a knife sticks it, and the rollers passes the slaughtered hog onward in the direction of the scalding vats. The pendant carcass hangs for about three minutes against a long string of others in their death throes or dead, and which are continually being unhooked and dropped into a long wooden vat filled with hot water. As fast as the man in the pen can attach his continually descending chains to hogs' legs they are being hoisted, killed, and passed on, and the rapidity may be judged from the fact that the killing of 5,000 can be accomplished in three-quarters of a day. Very few visitors care to remain long in this portion of the building, the continual squealing furnishing a hog orchestra of a deafening character, this, added to the sanguinary appearance and surroundings of the bovine shambles, makes this section of the building if not a chamber of horrors at least a horrible chamber.

The hogs on being dropped into the hot-water vat are stirred about with poles, the men working these to secure thorough immersion, and with them turning their bodies around, so that they are floated towards the bottom end of the vat at right angles across it. In the water, at the lower end of the vat, a revolving apparatus, with projecting arms like those on a paddle-wheel, lifts each floating carcass out of the water on to a long inclined table. A man here attaches a hook into the wound in the hog's throat and a chain fastened to the hook running in a groove in the table, worked by steam, draws the hog down the incline so that it passes through a series of revolving steel-blade scrapers, working at different angles so as to rub as much as possible the whole of the surface of the body and scrape the hair off it. On getting through these scrapers nearly all of the hair has been taken off, and, being unhooked, the carcass is passed on through the hands of at least twenty men, standing on either side of the still inclined table. These men have knives, and each cleans a portion of the body quickly as it passes onward. At the end of the table a man with marvellous rapidity removes each head, and while so doing another one has slipped an iron gambrel through the ham strings, and a descending chain and hook elevates the headless body, and it by means of rollers on an inclined steel

beam overhead, passes onward through between a long line of men, each of whom does something to it. The first wash, the next clean by scraping, then further on the bodies are opened, and the insides removed, then cut down the back by the next man, and chopped down the backbone by others. The two sides remain hooked on the one gambrel, then, by means of the inclined steel beams overhead and rollers, pass onward into a drying chamber. Here they hang for one and a half hours to dry, and are then moved onwards along the continuous inclined steel beams into a great refrigerating room. In this they have to remain for 48 hours to become thoroughly chilled. The refrigerating chamber at Armour's has a hanging capacity for 15,000 hogs.

From the slaughtering room to the refrigerator chamber, all the time, there is a continual stream of pork passing, no hog pausing more than a few seconds in any one place, in the distance described ; each one passes through the hands of over 100 men, all working with the quickness and dexterity acquired from long and extensive practice. So perfect are all the labour-saving appliances throughout this portion of the building that the carcass of the hog never once requires lifting or moving by manual labour. The slightly-inclined overhead beams and the travelling rollers, which bear the weight of the pendant carcass, cause it to move along solely by the momentum given by the weight of the body. From the refrigerating chamber the overhead steel beams lead into the cutting-up room, and the carcasses of pork, when chilled, are passed along them into it. Here are rows of long, strong tables, and the beams referred to pass directly over these. The carcasses on being pushed along, are unhooked from the gambrels and dropped on the tables, where they are rapidly dissected by expert butchers into hams, shoulders, sides of bacon, and other sections of hog products required. Alongside of each table are the mouths of wooden shoots, which lead, at sloping angles, to the floors beneath. Into each of these the various cut-up portions are placed, and each part slides away to its separate department below. In the salting department, in the basement, the hams, shoulders, and sides, on being salted, are built in separate stacks on the floor, immense quantities here being piled up undergoing this stage of curing. The basement is intersected with rails, on which low flat trollies run for conveying and removing the pork. It is unnecessary to describe in detail all the processes in operation in the manufacture of hog products in these immense packing houses, the doing of which would necessitate the writing of a very lengthy article, which would be of little benefit to the Victorian farmer until the industry is further advanced in the colony. Everything about these great packing houses is carried on on such a gigantic scale, and machinery and labour-saving appliances used, so as to reduce all cost of working to a minimum, that a description of the details of their operations would furnish nothing that

our farmers could benefit by at present. I may state, however, that there is not a particle about a hog which is not made use of and converted into money in these great packing houses. Starting at first on a small scale all these great packing houses have gradually increased and developed their business and trade until the result is seen in the gigantic operations referred to. Great fortunes have been made by many of these packers, and their operations have also, at the same time, materially aided the advancement and progress of the farmer. Armour, the founder of the great packing house in Chicago, and who has also another large establishment, employing over 1,000 men, in Kansas city, commenced operations as a pork butcher. He is also one of the largest grain operators in Chicago, and the principal shareholder in the Armour Elevator Company, which has eight elevators in the city, having a total storage capacity of 15,000,000 bushels.

Cudahy, the founder of the packing house referred to in Omaha, was at one time in the employment of Armour, and afterwards started on his own account. These firms, also a number of other large ones, who in addition to hogs, slaughter and cure and pack beef, build, and own all the refrigerator cars used by them on the railways for conveyance of their meats to the seaboard or distributing points. Each firm has its cars painted a different colour, and the company's name painted in large letters thereon. The Armour company has several hundred of these refrigerator cars running on the railway lines. By owning their own cars their operations are never hampered or inconvenienced for want of rolling-stock. It also furnishes an example of the energy and enterprise of the American people.

In this report I have given as concisely as possible a statement of the position of the hog-raising industry in the United States. Its importance as a wealth-producing factor, both to the individual farmer and the nation, will be perceived. What has been accomplished by the United States farmer in this direction is also quite possible of achievement, on a smaller scale, by the Victorian farmer. The prices mentioned, both for the live hog and the cured product, indicate that with proper attention, care, and management by our farmers a good margin of profit exists to induce them to enter extensively into this enterprise.

I may state that several gentlemen connected with the packing business made inquiries of the writer as to whether there were any such establishments in Victoria, and also about the number of hogs produced in the colony. They stated that if a sufficient number were raised to warrant it that there would be no difficulty in getting an establishment in operation to handle them.

LIVE STOCK AND FROZEN MEAT EXPORTATION FROM THE ARGENTINE REPUBLIC.

The successful and profitable exportation of the surplus stock of Australia to the old world markets of Europe, whether in the form of frozen meat or by shipment in a live condition, is a matter of supreme importance to it at the present time.

No colony has greater interest in the successful development of this trade than Victoria. Apart from finding a market for the surplus stock within her own territory, a very large area of the pastoral country of New South Wales and Queensland is owned by Victorians and worked by Victorian capital, thereby giving her a deep interest in solving the problem now engrossing the attention of those colonies. By some means markets must be found for, and our surplus stock transported thereto, in a manner which will leave some margin of profit on the operation to the producers. Failure to accomplish this simply means ruin to a large section of the community who have their all invested in stock raising. To the farmers of Victoria who combine grazing with agricultural operations, and depend on the profits derived from the former to counteract the unprofitable results attending the latter during the past three seasons of low prices, the question referred to is one of serious import. The price now being obtained for frozen meat on the London market leaves neither shippers or producers any great margin of profit, and if something cannot be done in the way of opening up new markets for it on the Continent or elsewhere, or in shipping our stock in a live condition (in which form it realizes a higher price) profitably to Europe, it will certainly fall in value with us, so as not to pay the cost of raising.

One of the countries coming into severe competition with Australia in the exportation of its surplus sheep and cattle is the Argentine Republic, and perhaps at the present juncture, some information, gathered during my recent visit to that country about its trade in this direction, and of its pastoral resources, may be of use to Victorian graziers and farmers. Australia is quite capable of holding its own with the United States or Canada in producing and exporting meat, the severe winters in those countries, and the cost of stall-feeding cattle and artificial feeding of sheep (an absolute necessity with them) counterbalancing the benefits derived from the lesser freight paid for the shorter passage across the Atlantic. Farmers in Canada and in various parts of the United States informed me that when the cost of feeding was considered, the prices now paid them by buyers for Europe left them no profit.

The Argentine Republic, however, enjoys a climate similar to that of Australia. Stock raising is carried on under conditions

much the same as with us, and she occupies the position of being our most formidable competitor in producing extensively and cheaply.

In my article on grain production in the Argentine Republic, a general description was given of the physical character of the territory embraced by it, and further repetition will not be necessary. The area of it was stated to be 1,212,600 square miles, or a little more than one-third that of Australia. About 800,000 square miles of this area are open level or gently undulating pampas or plains. These pampas, generally, are well suited for grazing and stock raising. Large areas in certain provinces have a coarse wiry grass growing on them not good for fattening, but on the other hand, immense tracts of country are covered with good, sweet, nutritious native grasses, excellently adapted for fattening sheep and cattle.

Lucerne, or alfalfa as it is termed, grows well almost anywhere on the pampas, and with especial luxuriance in certain parts of the provinces of Buenos Aires, Santa Fé, and Cordoba.

The total number of cattle in the Argentine Republic in 1888 was stated to be 22,870,000, and the present number must be largely in excess of this. In 1860 the total number of sheep was but 14,000,000, and in 1891 there were 85,152,700. A considerable addition to these figures would require to be made in stating their present numbers.

The province of Buenos Aires, containing 120,900 square miles, is the most important pastoral territory in the republic. The figures of Mr. Gibson, the best writer and most eminent authority on stock breeding and raising in the republic, and whose family have for 70 years occupied one of the largest and best-managed estancias in Argentina, may be quoted in order to show the grazing capabilities of the province referred to. He shows the grazing areas of it classified as follows, with the number of sheep on each section, and the average number carried per square mile.

PROVINCE OF BUENOS AIRES.

Carrying Capacity for Sheep.

	Pastoral Area in Square Miles.	Number of Sheep.	Average Number per Square Mile.
Sec. 1	48,415	48,144,000	995
Sec. 2	36,840	14,279,000	388
Sec. 3	18,260	2,417,000	132
Sec. 4	6,770	523,000	77
Total	110,285	65,363,000	592

Cattle	10,422,000
Horses	2,020,000

Mr. Gibson states that it must be remembered "that the cattle and horses mentioned are also grazing on the area of 110,285 square miles referred to. Further, that the land devoted to agriculture, about 5,000 square miles, and the land taken up in townships, &c., has not been deducted from the area calculated as pastoral land. Assuming that a cow consumes as much pasture as five sheep, and a horse as much as seven, the natural pastures of the province of Buenos Aires maintains stock at the rate of 186 sheep per 100 acres." Many estancias carry two and three sheep per acre.

It will thus be seen that this province must have excellent natural pasture land to carry the large amount of stock referred to. Droughts occur at times, also visitations of locusts, and large numbers of stock then perish; but, looking backwards, these do not seem at any period to have had any effect in giving more than the slightest temporary check to stock raising. Lucerne grows so well almost everywhere that a great deal of the loss of stock, by drought, could be prevented by sowing this more extensively. Good fresh water is obtainable everywhere by sinking to a depth of from 15 to 50 feet. Where there are no streams, numbers of wells are put down in different places on the estancias, and the water is drawn up with large buckets and a wire rope, by a horse working in the same manner as in a "whip" in shaft-sinking to certain depths in Victoria. Troughs are provided for its reception, and for stock to drink out of. A man and horse can, in this way, water 1,000 head of cattle per diem.

This primitive manner of water-drawing for stock throughout the republic, and the absence of windmills for doing the work, is very striking. The reason assigned for the continuance of this system is that horses and men can be obtained so cheaply for the work. Large tanks excavated, the same as in Australia, for water storage are not met with, and evidently would not answer, as all water seen in swamps or depressions on the pampas, during the hot weather, was in a state of stagnation, owing no doubt to the absence of lime in the surface soil, and the presence of so much "humus" or vegetable matter.

Perhaps one of the largest stock-breeding estates in the world is to found in the southern portion of the province of Buenos Aires, 60 miles from the port of Bahia Blanca. This is called the Curamalan Estate, and is owned by a company. It has an area of 700,000 acres, and out of this 160,000 acres are under cultivation, having been disposed of for this purpose under the "colony" system to Russian, Italian, and French colonists. On the balance of the estate the stock kept amounts to 300,000 sheep, 50,000 cattle, and 18,000 horses. The clip of wool on the estate for 1892 amounted to 1,410,000 lbs. The railway from Buenos Aires to Bahia Blanca passes through the estancia. The land on the estate was obtained as a concession from the Government seventeen years ago, this portion of the Argentine Republic being

but little known then, frequent raids of the Patagonian Indians making the life of the early settlers of it at that time a very dangerous one.

An ordinary estancia has about 10,000 head of cattle, and these are divided into herds of 2,000, two men attending to each herd. The wages of men amount to about £15 per annum and found.

The "gauchos," who are the stockmen of the pampas, are chiefly half-breeds of the Spanish-Indian races, many indeed being pure Indians. They are very good horsemen, and use the lasso to perfection.

In the province of Entre Rios, between the Parana and Uruguay Rivers, containing 31,600 square miles, there were in 1890 4,100,000 cattle and 4,900,000 sheep. A portion of this province being rather low lying, is splendid cattle country.

There are in it nineteen "saladeros" (establishments for drying and salting beef, chiefly for Brazilian and West Indian exportation) where 400,000 cattle are killed annually, and 13,000 tons of beef exported.

The Kemmerich factory for meat extract commenced its operations in 1891, gradually extending its operations until 1892, in which year it slaughtered 110,000 head of cattle. This company had a capital of £360,000, and is capable of treating 200,000 head of cattle per annum.

Its annual output is 300 tons of meat extract, 9,000 tons of salt beef, 900 tons of boiled beef, and 15,000 tons of meat-meal.

The company owns estancias having an area of 250 square miles and 60,000 head of cattle. Recently this company amalgamated with the Liebeg Company, of Tray Bentos, in Uruguay. This latter company, whose extract of meat is so well known, in the season kills up to 1,000 head of cattle daily, nearly all obtained from the Argentine Republic.

Santa Fé, the principal agricultural province, has 2,330,000 cattle and 2,920,000 sheep. In this province many estancia-owners are finding out the advantages of growing lucerne extensively for stock fattening, the soil being specially adapted for its growth. In no part of Victoria have I ever seen lucerne grow so luxuriantly without irrigation as in the province of Santa Fé, and the appearance of immense fields of it, thickly dotted over with cattle and sheep, was a sight to remember.

The general practice is to purchase drafts of $3\frac{1}{2}$ to 4 years old store bullocks from other parts of the country, and place these on the alfalfa pastures, and so fatten them up for shipment to Europe.

From time to time representatives of the firms in Buenos Aires engaged in shipping stock go around the estancias and purchase drafts of fat cattle and sheep, sending their men afterwards to take delivery of them, and load them on the trucks at the nearest railway point as soon as a ship to receive them is put on the berth. In this way they are put on board ship fresh and sound from the pastures without undergoing the deterioration inseparable from a long journey when driven.

In the vicinity of Las Rosas I visited one of the finest estancias in the province of Santa Fé. This was called "California Estancia," and was owned by Mr. J. Benitz, an American gentleman, a native of the Golden State. The estancia consisted of three leagues (or 20,000 acres) of undulating pampa country, all excellent soil. Finding it well adapted for lucerne, Mr. Benitz let the property out in small sections to "colonists" to grow wheat upon for two seasons, so preparing it for sowing with lucerne the third year. He has now got 18,000 acres of the estate under this fine fodder plant, and in a short time will have the balance sown also. The land is subdivided into six paddocks, and the stock is transferred from one to the other as feeding-off is required. Last season Mr. Benitz informed me he had fattened 12,000 head of cattle on the lucerne, and, in addition, had on the same land 7,500 sheep, 260 brood mares, and 500 pigs. The sheep and cattle fed together in the same paddocks, and I was informed that there never had been any necessity to keep them separate. The sheep were of the Hampshire Downs breed, a class found to do very well on this pasture. Even where heavily stocked the lucerne was not less than 9 inches high, and in other paddocks 2 feet long—wonderfully strong and luxuriant. Locusts were very bad at the time of my visit, the leaves of the trees and vines in the homestead garden being all eaten by them, yet their damage to the lucerne was hardly noticeable. Mr. Benitz stated that they did not seem to care about eating the lucerne where it was fed off, only damaging it when it attained a high strong growth. They then barked the strong stems. After passing over it the lucerne soon recovered its vigorous growth, more especially if receiving a shower of rain. In the neighbourhood of Las Rosas and northwards, areas of alfalfa on estates of from 1,000 to 4,000 acres are frequently met with, and the smaller agriculturists everywhere appeared to be going in for growing it.

Before proceeding further, it may be as well to refer more fully to the production of alfalfa in the Argentine Republic, as it promises to become a great factor in aiding stock raisers there to fatten for the European markets, and in addition furnish a good cheap food for feeding stock on ship-board when forwarding them in a live condition to Europe.

When sowing lucerne down on new land, the cost per "square" (an Argentine land measurement consisting of 4 English acres) is stated to be—

	Value. dols.	cents.
Breaking up soil	5	0
Cross-ploughing	4	50
Harrowing and sowing	0	45
Covering in seed and rolling ...	1	25
25 kilos of seed at 75 cents.	17	25
Total	28	75

With gold at a premium of 250, this amounts to £1 14s. 6d. per "square," or 8s. 7½d. per acre. If sown with the last wheat crop, as it generally is under the "colony" system (referred to in the article on wheat production), it is estimated to cost only 18 dollars 75 cents (£1 1s. 2d.) per "square," or 5s. 3½d. per acre. The cheapness of land and its quality have also been referred to fully in another article.

The area under lucerne in 1893 was stated to be 3,000,000 acres, and has undoubtedly increased largely since then. Lucerne hay is exported largely to Brazil, and cattle shippers find that any surplus of it, at the termination of the voyage to Liverpool or London, can always be disposed of profitably. One stock shipper informed me that he found it repaid him to have from 10 to 20 tons shipped on each steamer in excess of actual requirements to the ports named, as it always sold readily.

The adaptability of the Argentine Republic for its production would seem to indicate that the export of it will yet take next place to that of wheat and maize.

The cost of cutting, baling, and delivering it at a railway station, say, 7 or 8 miles distant are stated to be 17s. 4d. per ton. The general average price is about 35s. to £2 per ton. The most improved American presses are used for baling it, and, when in good condition and well cured, it can be subjected to an immense pressure, so that the bales occupy but a small space for railway transit or in shipment. From four to five crops of it can be reaped each season.

It has become a common practice in the province of Santa Fé for agriculturists to cultivate lucerne and then let it out for depasturing to large stock-owners or cattle dealers, who buy up forward stores and then fatten them by this means ready for shipment. The rent paid for alfalfa pasture for this purpose varies, but is generally 1s. to 1s. 4d. per head of cattle per month in summer, and 2s. 8d per head in winter. One "square" (4 acres) of well-established lucerne is expected to carry on an average four animals in summer and two in winter. In summer, however, after heavy rain, as many as fourteen or fifteen animals are put on per "square" to keep down the growth of this wonderful fodder plant.

The province of Cordoba has 1,300,000 cattle and 1,386,000 sheep; Corrientes, nearly 2,000,000 cattle and 650,000 sheep; Santiago, 600,000 cattle and 800,000 sheep. The other Andean provinces have smaller amounts. The pampas to the west and south of the province of Buenos Aires, including the partially-settled portions of Patagonia, are stated to have 9,000,000 sheep and about 1,600,000 head of cattle. The extensive Chaco province to the north contains some splendid cattle country, the climate being similar to the downs portion of Queensland. Mr. Benitz, the owner of the California estancia referred to, informed the writer that he had recently purchased a large tract of pastoral country in the Chaco (some 300 miles distant from his other

property) with, a view of raising cattle there, and afterwards transferring them to his alfalfa-sown estancia to complete their fattening for the European shipment.

The foregoing description will convey some idea of the extent of stock raising in the Argentine Republic, and its possible development.

General reference will now be made to the class of stock raised, showing the change taking place (more especially in sheep breeding) through efforts being made by the Argentines, to adopt themselves to requirements of European markets.

Sheep were introduced to this portion of South America, by the Spaniards, 345 years ago. The history of their subsequent deterioration to the level of an inferior type of partially wild wool-producing animal need not be referred to here. In the beginning of the present century efforts were commenced to improve matters by introducing better classes of sheep, chiefly merinos, from other countries. The early inferior breeds eventually became supplanted by a fair, and in many places, excellent class of merino. The merino was the universal breed throughout the republic until about 1882, when the merits of the Lincoln began to be recognised by many of the principal breeders. A better demand for long wool helped greatly to cause a movement to take place in the way of crossing the Lincoln with the merino. In 1883 two large establishments were built, one by Messrs. Drabble, at Campana, on the Parana, the other by the Sansinena Company, near Buenos Aires, for freezing mutton.

These were followed by others, and at the present time there are five immense establishments in the Argentine Republic for freezing mutton, having a capacity for treating 3,000,000 carcasses per annum. Consequent on the demand for freezing purposes of a larger carcass than the merino could supply, also the ready sale for long wool referred to, a great and rapid change in sheep breeding took place.

Mr. Gibson, in his work on sheep breeding in the republic, states :—"It is probable that at the present time nearly one-half of the total sheep in the Argentine own to one cross or more with the Lincoln or Leicester breeds, chiefly the former. The fine merino or mestizo, that is those entirely free from contamination with the long wools, are chiefly to be found in the north and north-west of the province of Buenos Aires, in the provinces of Cordoba, Santa Fé, and Entre Rios, and the Pampa Central. A few runs are still to be found in the east and south of the province of Buenos Aires, where there are pure merino flocks, but these are generally standard farms, which have obtained celebrity for their produce, and command a market for their rams and increase. Judging from the continued and still increasing demand for Lincoln sires, it may be presaged that, in another four or five years, the pure merino or mestizo stock left in the Argentine will be a very small fraction of the whole. The years 1888 to 1894 are

witnessing the conversion of 50,000,000 sheep from one type to another. A conversion profitably without parallel in the annals of the sheep-breeding industry.

He further states—"Not only does the Lincoln cross supply a saleable fleece of excellent quality and weight, but it also gives the European market the carcass most in favour of the public—a medium size of sweet flavour.

"The cross still preserves the flavour so well known in all the merino breeds, and at the same time possesses, by reason of its Lincoln blood, a capacity for fattening not enjoyed by the pure fine wool. When, however, the cross becomes of a too pronounced Lincoln type, the mutton loses its quality, gaining considerable weight in its place. The home markets look upon frozen mutton so inferior to that produced in the old world, that they have not yet pronounced in favour of any special breed; but the day cannot be far distant when this will cease to be the case, and then the coarse-grained pure Lincoln will fall in disfavour with the freezing establishments."

Further remarks by Mr. Gibson on the difference in prices of Argentine and New Zealand frozen mutton, also on the commercial aspect of the freezing business, may be quoted:—"The reason why Argentine mutton averages an inferior price to that of New Zealand has a threefold explanation. In the first place, New Zealand possesses to-day a mutton-producing breed superior to that grown on the Plate. In the second, the New Zealander feeds his stock during the winter time with extra forage, whilst in the Argentine the sheep are allowed to graze upon the same bare pampa during the dead season. The result of this is that the New Zealander produces an even well-grown carcass, whilst there is sent home from the Argentine one upon which a hasty covering of fat has been put during the spring months of the year. The difference between the two carcasses will readily be noted by any one who cares to pay a visit to Smithfield. Thirdly, the freezer in New Zealand freezes the mutton on account of the breeder, and in Argentine the freezer buys from the breeder. The disadvantage of the latter system, so long as the breeder has no knowledge of the requirements of the market, is apparent. The New Zealander selects his wethers with care, rejecting any which will give an inferior weight, or which are insufficiently fattened for the butcher. He remits them in small droves to the freezing establishments, and takes every care that they arrive in perfect order. The Argentine breeder, on the other hand, makes a contract with the representative of the freezer to sell a given number, and the latter binds himself to remove them within a certain date. The breeder endeavours to sell the greatest number possible, and it is easily comprehended that the buyer who selects from a farm, carrying anything between 10,000 and 100,000, must, perforce, remove many wethers unfit for the meat market. The freezer has

probably extensive paddocks, but he cannot fatten up the great quantity of store stock which arrives together with the fat wethers; they must alike go to the butcher's knife, and so the mutton which comes to the European consumer is of inferior quality, and more uneven than that imported from New Zealand.

"Nevertheless, the conversion of the freezer into a mere commission agent is not the most felicitous solution of the frozen meat question. There must exist some intelligent observation of the market to determine when to remit supply and when to withhold it. The breeder is not in a position to do this, and the individual effect of his own produce would not materially influence the price list either way. The freezer should assuredly be an interested party. The best system, therefore, and one already in some use in the Argentine, is to establish a scale of prices proportionate to the dead-weight return of the sheep sent in by the breeder. This would stimulate the sheep raiser to turn out wethers of an even weight and quality, and secure to the freezer remunerative prices at home."

From the foregoing statement, made by one of the most prominent sheep breeders in the Argentine, it will be seen that sheep breeders in that country have endeavoured, as promptly as possible, to adapt themselves to certain altered requirements in the wool trade, and also provide an animal suitable for freezing or shipping in a live condition. That they are keenly alive to making their export business in frozen meat a success, and are endeavouring to profit by any better methods of detail in vogue in New Zealand, is shown by the latter remarks made by Mr. Gibson for the benefit of Argentine sheep breeders.

The result of this ready adaptation is that at the present time the Argentine Republic has a supply of the class of sheep required by the European consumer, and is able to maintain a place in the front rank as an exporter of them, both in a frozen or live condition.

The names of the large freezing companies of the Argentine Republic are:—The Sansinena Co., Nelson's New River Plate Co. Ltd., Messrs. O'Connor & Co., River Plate Meat Co. Ltd., and Drabble Bros. The Highland Scot Tin Canning Co. Ltd., at Quilme's, 20 miles from Buenos Aires, is an extensive industry, established two years ago for canning beef and mutton. In addition to handling upwards of 1,000 head of cattle per day, the factory can also treat 2,000 sheep per diem, freezing those carcasses suitable for exportation, and canning the smaller and inferior animals.

The total exports of frozen sheep in 1892 amounted to 25,041 tons, and for last year—1894—36,485 tons, a very great increase in so short a period.

Cattle in Argentina were at one time simply raised for the returns furnished by them in the shape of hides, bones, and tallow,

these, 50 years ago, constituting most important items of export from the republic. The animals were of an inferior breed, their chief characteristics being thick hides and well-developed horns. Large numbers of these animals are still in existence in some provinces, and a considerable percentage of the cattle almost everywhere retain some of the bad points of their progenitors. Effort, however, has been made by importation of good stock to improve the breed, the result being that on many large cattle estancias the old type has been entirely supplanted by a good large-framed excellent beef animal. Durham or shorthorns have been largely introduced, and special attention to further and more extended improvement of breeds is sure to be given in the future, consequent on the great development taking place in the export of live cattle to Europe.

For many years a large export trade in live cattle from Argentina to Brazil has been carried on. The Brazilians were never very critical in reference to the class of cattle shipped to them, only requiring a passable fairly-conditioned animal. The large business done with that country also in dried or jerked beef did not require any specially good class of cattle. For the wants of the European consumer good cattle must be supplied, and apparently every effort has been and is being made to provide them.

When in the Argentine Republic, I met with a former Australian in the person of Mr. Daniel Kingsland, a member of a firm who are the largest shippers of live cattle and sheep from that country to Europe. Mr. Kingsland is looked on as the pioneer of the great live stock shipment trade from Argentina to Europe, having made a commencement at it seven years ago. By untiring attention to this business, travelling time after time personally on steamers carrying their shipments of stock from Buenos Aires to England, until he acquired a knowledge of every detail necessary to insure success, he has thoroughly mastered all the difficulties connected with it. Every point and detail in connexion with fittings, feeding, watering, and attention to animals in course of shipment has been carefully studied by Mr. Kingsland until he has been able to arrange everything relating thereto in the most perfect manner possible. By this means his company has been able to extend its operations yearly, so that at the time of my visit, during the height of the season, they were shipping 1,000 head of cattle and 5,000 sheep weekly to England.

Mr. Kingsland furnished me with a considerable amount of information relating to live-stock shipment. He gave me, and I accepted, an invitation to accompany him on a visit to several large stock estancias in the interior to see the class of animals purchased for shipment, and to witness their subsequent loading on the steamers.

All live stock exported from the Argentine Republic to Europe is shipped thence entirely on the decks of grain-carrying steamers.

The deck space of all these vessels is chartered by live-stock shippers, the lower deck for cattle and the upper for sheep. If only the main deck is available it is reserved for cattle-loading, and a temporary upper deck is constructed of strong frame work bolted together, and close pine flooring nailed on this, on which pens are fixed.

Steamers load their grain cargoes at Rosario, then drop down the river to Buenos Aires, and enter the docks, where carpenters at once proceed to fit up the decks with stalls, pens, &c., for reception of stock ; large numbers of men working night and day on each vessel in order to complete the work quickly.

All deck space has been previously measured off, so as to allow an exact allotment for each animal. For each sheep 6 superficial feet of space is allowed, and for each bullock 8 feet in length clear, by 32 inches in width. The sheep pens are provided with small troughs (formed by nailing three boards together) passing along the end of each for holding food or water. Larger ones are fixed along the cattle stalls. All the fittings required are of pine, and this being admitted duty free from the United States costs (including erection, &c.) only 7s. 6d. per head for cattle.

Concerning the average number of cattle and sheep carried by an Argentine stock vessel, a fairly accurate idea may be obtained. When in London I obtained from Messrs. Pritchard and Moore, of Smithfield (the English representatives of the Anglo-Argentine Stock Agency Company), a list of the ships chartered by them this season so far. These numbered 51 steamers, all of which had arrived and discharged their stock at Liverpool and London prior to 11th April. This fleet (all grain laden in addition) carried a total of 8,327 head of cattle, 43,853 sheep, and 127 horses. Of these steamers 45 were laden with both cattle and sheep, five with sheep, and one with cattle only. This would give an average of 181 head of cattle and 954 sheep to each steamer, carrying both on board. The two largest cargoes were taken by the steamers *Hurona*, carrying 570 bullocks and 2,000 sheep ; and the *City of Lincoln*, with 630 bullocks and 750 sheep.

Cattle and sheep for shipment are brought down by train from estancias in the interior, and conveyed direct alongside of the shipping docks.

The Buenos Aires docks, covering an area of 165 acres, have been excavated and constructed clear of the La Plata River (like those on the Yarra), and are among the finest in the world. They were completed at a cost of £6,000,000, the stone in them having to be brought from Monte Vide in Uruguay. Excellent stock-yards have been erected at several places near them and within 80 feet of where the vessels to receive live stock lay. The stock is placed in these yards and loaded from them by means of a box-sling and a steam crane direct on to the vessels. The box-sling used has an open top, and swing doors front and rear.

The bullocks are driven out of the main yard up a narrow "crush," from whence, one at a time, they enter the box-sling. Here expert gauchos slip and fasten a strong rope around the animal's horns for the purpose of securing the animal in its stall on the ship. The crane is set in motion and the sling elevated and swung quickly and easily on to the deck, the door is raised and the animal is soon in its stall and fastened securely by its head-rope. Sheep are also loaded in the box-sling, and transferred quickly by it to their pens on deck. Notwithstanding that many of the cattle received from large estancias are inclined to be "lively," they are handled by men who know their work in such a manner that no hitch occurs.

The bullocks shipped are crosses of the shorthorn or Durham, of an average live weight when purchased of 1,400 lbs. These cost the shipper, at the time of my visit, from £7 to £7 10s. per head on board ship.

The sheep are crossbred Lincoln or Leicester, and have an average live weight of 135 lbs. each, and cost from 13s. to 15s. when put on the ship.

The voyage for a grain steamer laden with live stock from Buenos Aires to London occupies on an average 30 days, and is generally a fairly smooth passage, especially in the months of January, February, and March when the bulk of the shipments take place.

The principal feed used for stock on board these steamers is alfalfa hay, well pressed into handy bales; the best quality only is used. This costs on an average £2 5s. per ton f.o.b. In addition to this crushed maize and bran are used, especially for sheep. The consumption of food by animals is 25 lbs. for each bullock and 5 lbs. for each sheep per day. The consumption of water is 10 gallons per bullock and 1 gallon per sheep per diem.

An agreement is generally entered into between the shipper of stock and the shipping agents, the text of which, as it gives some information, may perhaps be quoted *in extenso*. The following is a copy of one :—

"Shipping Agreement.

"We hereby agree to let Mr. Thos. Brown, representing the Live Stock Company, all the deck space, &c., for the purpose of carrying live stock (cattle, horses, or sheep), on the following conditions :—

"Place of loading—
"Destination—
"Price—
"Fittings—

"Animals to be placed on board by shipper; ship giving use of winches and gear, if necessary.

"Wharfage on account of shipper.

"Ship to provide fresh water; if condensed to be properly cooled, at the rate of 10 gallons a day for cattle and horses, and 1 gallon per day for sheep; ship to provide tanks or casks on deck for deposits of same; shipper to provide buckets and other implements.

"Ship to carry sufficient fodder at the rate of 25 lbs. per day for cattle and 5 lbs. per day for sheep for a voyage of days; seven days' fodder to be landed free of freight, and any surplus over this to be paid for at current rates.

" tons space measurement to be allowed under hatches for the stowage of fodder, and the balance to be carried on deck or hatches, but to be covered over with sails or tarpaulins by ship to prevent it being damaged by rain or salt water.

"Ship to provide passage for a foreman cattleman, who is to live apart from his men, and also to receive a return second-class passage to Buenos Aires; also to carry one cattleman for every 25 cattle or horses or 150 sheep, or part of same number.

"Should the foreman cattleman require any assistance in clearing away manure to keep the ship clean, ship to give the necessary assistance.

"Seven days' notice to be given by ship of her being ready to receive animals, and should she be not ready to receive within 48 hours from the expiration of the notice, ship to pay maintenance of the animals at the rate of 1 dollar (equal to 1s. 2d.) per day for cattle and horses and 50 cents (7d.) per day for sheep until they are loaded.

"Twenty-four daylight weather working hours to be allowed for placing animals on board, time to count from when installations are ready and cargo finished, no broken days to count; and twelve daylight weather working hours for the discharge of animals.

"If installations belong to shipper, twelve daylight working hours additional to be allowed to remove them and manure; but if installations belong to ship they are to be cleaned on ship's account.

"In the event of horses being shipped, if steamer is not going into a dock in London, she will land her horses at wharf, Blackwall; Liverpool horses to be landed at the dock ship goes to.

"In the event of steamer being detained by shippers, demurrage to be paid at the rate of per daylight weather working hour.

"All other conditions as per bill of lading."

Shipping freights for cattle range from £3 10s. to £5 per head. The latter is the price generally quoted, but owing to the plenitude of shipping offering this season at the River Plate, consequent no doubt on the grain crop of Argentina falling far short of pre-harvest anticipations, a wide range of cattle freights are named. Sheep freights are from 10s. 6d. to 12s. 6d., the average being probably about 11s. per head.

The persons sent in charge of cattle and sheep in course of shipment are selected steady reliable men, having a thorough

knowledge of stock. A class of these can now be found, who, from the frequency with which they have made ocean trips with live stock, are thoroughly trained to the work. Mr. Kingsland has had his head men so trained, and all shipping details perfected in such a manner that the percentage of losses of stock in shipment has been reduced to a minimum as far as his company's operations are concerned. He informed me that their losses of cattle on ship-board amount only to 1 per cent., and of sheep 2 per cent.

Heavy losses, however, occasionally do occur yet on some vessels. A few days before leaving Buenos Aires a steamer, named the *Rolland*, sailed for Liverpool with 250 head of cattle between decks. The German steamer, on which the writer travelled, encountered heavy weather and high seas between the equator and the Canary Islands. On putting into Las Palmas (a port in the Canaries) to take in coal, we found the *Rolland* just arrived there also for the same purpose, and ascertained that she had lost 44 head of cattle out of her complement whilst passing through the same bad weather experienced by us. The immediate cause of this great loss was stated to be insufficient ventilation, resulting in the animals dying.

With a view of obtaining a full insight into the details of stock management and feeding in course of shipment, the writer arranged to travel from Buenos Aires to Liverpool on a live-stock steamer, and went so far as to partly secure a passage on the *Urmston Grange*, a new vessel, built with certain improvements for stock-carrying. Owing, however, to certain alterations having to be made in her, and her sailing being postponed from day to day, I took my passage in another vessel. The *Urmston Grange* succeeded in getting away soon after us, with 418 bullocks and 1,600 sheep, and arrived in Liverpool prior to my departure from London for Australia. Calling on her London agents to ascertain how she had fared, they informed me that twenty head of bullocks had died on board of her during the passage, some rough weather having been met with.

The *Urmston Grange* has been chartered to load a shipment of live stock from Sydney to London, her next trip being to Australia for this purpose. She is an entirely new vessel, with more space between decks for cattle shipment and better ventilated than other vessels noticed as engaged in the Argentine live-stock trade, and should therefore prove to be a good steamer for taking an Australian shipment.

Cattle shipped from the Argentine Republic to England are all slaughtered within ten days of arrival, at Liverpool or Deptford.

An exceptionally good grass season in the Argentine Republic this year and the consequent abundance of fat stock gave a great impetus to this live-shipment business. Rains had fallen from time to time through the summer, causing an abundant growth of feed, and stock therefore were in splendid condition everywhere.

Stock-owners in most provinces stated that it had been one of the best seasons for grass ever experienced by them.

The total number of cattle shipped from the Argentine Republic during the year 1894 amounted to 220,490, and sheep 122,218. Of the cattle, however, the larger proportion have been exported to Brazil, the number shipped to Europe only not being ascertainable.

On putting the question to Mr. Kingsland—Do you think we can ship live cattle from Australia to Europe profitably? He replied that he was sure we could if the matter was properly gone into, and we understood how to proceed about it. Having, however, recently been in England when a consignment of Australian cattle arrived, he said a great deal had yet to be learned by shippers in Australia before success would be achieved. He admitted that our cattle suitable for shipment were superior to the same class in the Argentine. It is, therefore, for our shippers to study the details of the live-shipment business, and so overcome any of the minor difficulties standing in the way of success.

The foregoing report will give Australian stock-owners a fair idea of the resources of a country which is coming strongly into competition with them in the exportation of meat and stock, and will serve to show that we must be on the alert, if desiring to maintain a foremost position in supplying the wants of the old world with these things.